CLIMATE RELATED RISKS IN EIB PORTFOLIO
FIRST FINDINGS

SCIENCES PO GROUP PROJECT - EIB INSTITUTE
The total outstanding volume of signed loans as of end-2015 amounted to **EUR 563.5bn** (2014: EUR 549.1bn), of which 89% was for projects within the EU (2014: 89%).

Around 50% of the exposure concentrates in 4 EU countries and in 4 main sectors.

Source: EIB Activity Report 2015
EIB IS A LONG TERM LENDER AND DOES NOT DIVEST
CLIMATE RELATED RISKS IN EIB PORTFOLIO

- 2 distinct families of risks

- Physical Risks

- Transition Risks

The physical risks caused by Climate Change are extremely localised:

Example - the different physical risks predicted for North and South of Spain, even though they are part of one country.
CLIMATE RELATED RISKS – PHYSICAL IMPACTS VARY ACROSS SEASONS

Source: EEA, 2008

Model Results
Seasonal Changes of River Run-off in Europe (2071-2100/1961-90; SRES A2)

River Run-off in Europe
(2071-2100/1961-90; SRES
A2)

Note: Simulations with LISFLOOD driven by HIRHAM – HadCM3/HadCM3 based on IPCC SRES A2 scenario
Source: Dankers and Feyen, 2008.
EIB FINANCED PROJECT – METRO MALAGA (DECEMBER 2016)
The expected climate change risks in the Europe have been stated based on the following categories:

- Arctic
- Coastal Zones
- North Western Europe
- Mediterranean Region
- Northern Europe
- Central and Eastern Europe
- Mountains

**Arctic**
- Temperature rise much larger than global average
- Decrease in Arctic sea ice coverage
- Decrease in Greenland ice sheet
- Decrease in permafrost areas
- Increasing risk of biodiversity loss
- Intensified shipping and exploitation of oil and gas resources

**Coastal zones and regional seas**
- Sea-level rise
- Increase in sea surface temperatures
- Increase in ocean acidity
- Northward expansion of fish and plankton species
- Changes in phytoplankton communities
- Increasing risk for fish stocks

**North-western Europe**
- Increase in winter precipitation
- Increase in river flows
- Decrease in abundance of species
- Decrease in energy demand for heating
- Increasing risk of river and coastal flooding

**Mediterranean region**
- Temperature rise larger than European average
- Decrease in annual precipitation
- Decrease in annual river flow
- Increasing risk of biodiversity loss
- Increasing risk of desertification
- Increasing water demand for agriculture
- Decrease in crop yields
- Increasing risk of forest fire
- Increase in mortality from heat waves
- Expansion of habitats for southern disease vectors
- Decrease in hydropower potential
- Increase in mortality from heat waves
- Decrease in summer tourism and potential increase in other seasons

**Northern Europe**
- Temperature rise much larger than global average
- Decrease in snow, lake and river ice cover
- Increase in river flows
- Northward movement of species
- Increase in crop yields
- Decrease in energy demand for heating
- Increase in hydropower potential
- Increasing damage risk from winter storms
- Increase in summer tourism

**Mountain areas**
- Temperature rise larger than European average
- Decrease in glacier extent and volume
- Decrease in mountain permafrost areas
- Upward shift of plant and animal species
- High risk of species extinction in Alpine regions
- Increasing risk of soil erosion
- Decrease in ski tourism

**Central and eastern Europe**
- Increase in warm temperature extremes
- Decrease in summer precipitation
- Increase in water temperature
- Increasing risk of forest fire
- Decrease in economic value of forests
EXPECTED CLIMATE CHANGES IN OTHER REGIONS

- **Latin America** more extremes, desertification and reduced water availability
- **Caribbean** islands will experience more extremes and sea level rise and lower fish catch
- **Pacific** will experience more extremes, but sea level rise is an even bigger problem than in the Caribbean.
- **Sub Saharan Africa** will get dryer, in particular southern Africa, also negatively affecting food security but will experience more extreme rain i.e. floods.
- **Asia**: Heat stress, extreme precipitation, drought and water scarcity, longer and more intense heat waves, flooding in combination with cyclones e.g. extremes
The more rigorously the 2° Celsius limit is targeted, the greater the transition required by CO2 intensive industries.

Unexpected, massive regulatory interventions to reduce CO2 emissions could lead to abrupt price drops in assets, and impact entire industries.

ENERGY
TOTAL SIGNED END 2015 – EUR 105 BN
EXPOSURE END 2015 – EUR 85.9 BN (20% OF TOTAL EXPOSURE)
AVERAGE LOAN TENOR – 16 YEARS
ENERGY – GENERAL TRENDS

2°C Scenario = severe reductions of GHG emissions

The EU 2030 Energy Strategy

- 40% cut on GHG emissions (compared to 1990 levels)
- At least 27% share of renewable energy consumption
- At least 27% energy savings (compared with the business-as-usual scenario)

➢ Operation & consumption of oil and gas represents 39% of anthropogenic GHG = most affected by regulations & transition
Main sub-sectors

4 main sectors:

- **Electricity gen** = €40.8B
- **Power transmission and distribution** = €38.8B
- **Petroleum & natural gas production** = €5.9B
- **Oil & Natural gas transmission** = €13B
### Sub-sectors

<table>
<thead>
<tr>
<th><strong>Sub-sectors</strong></th>
<th><strong>ENERGY</strong></th>
<th><strong>SECTOR OVERVIEW</strong></th>
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</thead>
<tbody>
<tr>
<td>Electricity generation (€ 40.8 B)</td>
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<td><img src="#" alt="Sector Overview" /></td>
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<tr>
<td>Power transmission and distribution (€ 38.8B)</td>
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<tr>
<td>Oil and natural gas transmission and distribution (€ 13B)</td>
<td><img src="#" alt="Energy" /></td>
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<tr>
<td>Petroleum and natural gas production (€ 5.9B)</td>
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<tr>
<td>Heat production (€ 3.5B)</td>
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<td><img src="#" alt="Sector Overview" /></td>
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Physical risks in the energy sector
## ENERGY – PHYSICAL RISKS

### Exposure to chronic or acute weather events

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<th>Air T°</th>
<th>Water T°</th>
<th>Water availability</th>
<th>Wind Speed</th>
<th>Sea Level</th>
<th>Floods</th>
<th>Heat waves</th>
<th>Storms</th>
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<td>Hydropower</td>
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<td>Solar PV</td>
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<td>T&amp;D Grids</td>
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## Climate change risks for the Energy sector: overview

### Sub-sectors

<table>
<thead>
<tr>
<th>Sub-sector</th>
<th>€ Value</th>
<th>Risk Category</th>
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</thead>
<tbody>
<tr>
<td>Electricity generation</td>
<td>€ 40.8 B</td>
<td><img src="#" alt="Yellow" /></td>
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<tr>
<td>Power transmission and distribution</td>
<td>€ 38.8B</td>
<td><img src="#" alt="Green" /></td>
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<tr>
<td>Oil and natural gas transmission and distribution</td>
<td>€ 13B</td>
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<td>Petroleum and natural gas production</td>
<td>€ 5.9B</td>
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<tr>
<td>Heat production</td>
<td>€ 3.5B</td>
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</tbody>
</table>
Carbon intensive loans

2 Carbon intensive sectors:
- **Petroleum & natural gas production** = €5.9B
- **Oil & Natural gas transmission** = €13B

+ Specific sub-sectors in
- **Electricity Generation**
- **Heat production**
FOSSIL FUELS ENERGY PORTFOLIO

- Crude petroleum and natural gas production – EUR 4,833.7 m
- Oil and natural gas transmission and distribution – EUR 10,922.7 m
- Power and heat generation from fossil fuels – EUR 8,236.0 m

= EUR 24 bn (5.4% of total exposure)

(of which, EUR 10.6 bn signed in the last five years, compared to EUR 14bn RE signed in the last five years)
Transition risks: carbon intensive loans

Carbon Intensive loans are concentrated in 3 countries: **Italy, Spain** and the **UK**...

... All bound by the **EU INDC of 40% GHG reduction** by 2030!

- **Policy impacts**: strict regulations on GHG emissions, ...
- **Economic impacts**: increase of Carbon price on the ETS (€17 in 2020, €30 in 2030)
- **Reputation impacts**: divestment campaigns, naming & shaming

**Gaz** represents **nearly 90%** of Carbon Intensive loans:

- **Stranded assets**: gas production & transmission infrastructure
- **Contamination risks** (flares & leaks) => **strict liability** for cleanup & remediation
Other opportunities

Several opportunities with the 2°C transition scenario:

• Energy efficiency: CHP, power grid efficiency, circular economy...
• Carbon capture (risks ?)
TRANSPORT
TOTAL SIGNED END 2015 – EUR 196 BN
EXPOSURE END 2015 – EUR 159 BN  (36% OF TOTAL EXPOSURE)
AVERAGE LOAN TENOR – 23 YEARS
The reliance on fossil fuel-based transport systems has a very high local and global environmental price tag.

- Transport in the EU still depends on oil for about 94% of its energy needs. (2016)
- The transport sector produces roughly 23% of global CO2 emissions and is the fastest-growing source globally. (OECD)
- Without further policy action, CO2 emissions from transport could double by 2050.
- Transport is fundamental to our economy and society. Mobility is vital for the internal market and for the quality of life of citizens as they enjoy their freedom to travel.
TRANSPORT – REDUCTION TARGETS

EC White Paper on Transport (2011): Growing transport and supporting mobility while reaching a 60% emission reduction by 2050

COP21: Paris Process on Mobility and Climate
- **Avoid** (reduce unnecessary travel: land use planning, logistics redesign, halt counterproductive regulation that incentivizes travel by individual motorized vehicles)
- **Shift** (shift movement of goods and people to the most efficient modes, by scaling up good practices) -> some modes of transport cannot be substituted
- **Improve** (improve environmental performance of fuels and powertrains, intermodality and transport management)

EC Strategy for low-emission mobility (2016)
- Increasing the efficiency of the transport system.
- Speeding up the deployment of low-emission alternative energy for transport.
- Moving towards zero-emission vehicles.
<table>
<thead>
<tr>
<th></th>
<th>Passenger</th>
<th>Freight</th>
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<tbody>
<tr>
<td>Infrastructure</td>
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<td><img src="image2" alt="Infrastructure" /></td>
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<tr>
<td>Vehicle</td>
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</tbody>
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TRANSPORT PORTFOLIO BY SUBSECTOR AND INSTRUMENT

Total

Transport

- Space transport
- Exceptional structures
- Other forms of transport
- Sundry transport infrastructure
- Transport
- Intermodal centres
- Sea transport
- Air transport
- Urban transport
- Railways
- Roads, motorways

Total

- Transport Equity/ Q-E
- Transport Framewk loan
- Transport Guarantee
- Transport Investm. Loan

143,620.6
146.3
14,741.5
887.1
## TRANSPORT

### Climate change risks for the Transport sector: overview

<table>
<thead>
<tr>
<th>Sub-sectors</th>
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<th>⛱</th>
<th>🕯</th>
<th>🛤</th>
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<tbody>
<tr>
<td>Roads and Motorways (€ 67.7B - 34.4%)</td>
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<td>🛠</td>
<td>🔌</td>
<td>🌿</td>
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<tr>
<td>Air Transport (€ 13.1B - 6.7%)</td>
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<td>🛠</td>
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<tr>
<td>Sea Transport (€ 10.3B - 5.2%)</td>
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</tbody>
</table>
TRANSPORT – PHYSICAL RISKS

- Infrastructure damage and destruction
- Functional interruptions and operational disruptions
- Increase in rehabilitation & maintenance costs
- Changes in sedimentation affecting inland water transport and ports’ functionality and operations
- Change in soil and slope stability (slope failure and landslides)
- Safety hazards for transport providers and users
## TRANSPORT

### Climate change risks for the Transport sector: overview

<table>
<thead>
<tr>
<th>Sub-sectors</th>
<th>![Flashlight]</th>
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</tbody>
</table>
Avoid-Shift-Improve:

- Broad technological improvement is needed across all modes to achieve higher fuel and infrastructure efficiency.
- If we are committed to the 2°C scenario, regulation risk increases (if progress is slower than expected) and impacts most polluting modes.
TRANSPORT – TRANSITION RISKS: SUB-SECTOR TRENDS

Current pledges (EU):

- Halve the use of ‘conventionally fuelled’ cars in urban transport by 2030; phase them out in cities by 2050; achieve essentially CO2-free city logistics in major urban centres by 2030.
- Low-carbon sustainable fuels in aviation = 40% by 2050; also by 2050 reduce EU CO2 emissions from maritime bunker fuels by at least 40%.
- 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, facilitated by efficient and green freight corridors.

A roadmap for rapid decarbonization (J. Rockström et al. 2017)

- Phasing out sales of combustion engine vehicles by 2030?
- Carbon-neutral air travel within two decades?
- Cities going entirely fossil fuel–free in the next 13 years?
TRANSPORT – INVESTMENT RISKS

Adding value in a context of declining demand:

• Long average loan tenor, 20+ year horizon projects
• Transport substitution:
  • Freight -> Local production, 3D printing
  • Passenger -> Teleworking, driver less transport
• Infrastructure/Vehicle Lock-in -> network compatibility
• Optimistic PPP forecasts?
• Forced stop of most polluting transport modes if no technological breakthrough:
  • Air transport, Sea transport (low-carbon fuel)
New Business Opportunities:

• Alternative fuel vehicles:
  • Emphasis on least polluting mean of mass transport
  • Other forms of individual transport
  • Car sharing, self-driving cars, electric propulsion devices
  • Transport without machines (urban infrastructure, land planning)
• Climate resilient new infrastructure or improved old infrastructure
  -> Dependence on Energy and energy efficiency
  -> Need for full electrification, reliance on Industry innovation
INDUSTRY
TOTAL SIGNED END 2015 – EUR 41.4 BN
EXPOSURE END 2015 – EUR 35 BN  (8% OF TOTAL EXPOSURE)
AVERAGE LOAN TENOR – 10 YEARS
### General trends (from COP 21)

<table>
<thead>
<tr>
<th>Trend</th>
<th>Sustainability</th>
<th>Environment</th>
<th>Economy</th>
<th>Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decarbonisation (net zero emissions) by 2050</td>
<td><img src="https://via.placeholder.com/15" alt="Green Light" /></td>
<td><img src="https://via.placeholder.com/15" alt="Green Light" /></td>
<td><img src="https://via.placeholder.com/15" alt="Yellow Light" /></td>
<td><img src="https://via.placeholder.com/15" alt="Green Light" /></td>
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<tr>
<td>All industry will need to decrease energy use: focusing on the energy</td>
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<td><img src="https://via.placeholder.com/15" alt="Green Light" /></td>
<td><img src="https://via.placeholder.com/15" alt="Yellow Light" /></td>
<td><img src="https://via.placeholder.com/15" alt="Green Light" /></td>
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<tr>
<td>sector’s efficiency, resource efficiency and end user efficiency.</td>
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<tr>
<td>… while protecting the competitiveness of export industries</td>
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<td>Increased innovation effort</td>
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INDUSTRY PORTFOLIO BY SUBSECTOR AND INSTRUMENT

- Industry Equity/ Q-E: 0%
- Industry Framework loan: 6%
- Industry Guarantee: 1%
- Industry Investm. Loan: 93%
Transition risks may be very significant: a few examples

- Addressing regulatory change across sector-specific environmental metrics
- Enhancing efficiency
- Adapting to changes in consumer preferences
- Adapting to technology developments and disruptions
### INDUSTRY

<table>
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<tr>
<th>Opportunities</th>
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<tr>
<td>Energy reduction as an EIB’s value</td>
<td>![Lightning]</td>
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<td>Formalizing operations and maintenance plans</td>
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<td>Implementing renewable energy solutions</td>
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<td>Combined Heat and Power (CHP) technology</td>
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<td>Reducing the demand on utility grid</td>
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<td>Lowering GHG emissions</td>
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<td>Reputational risk</td>
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<td>Disruption</td>
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<tr>
<td>Questioning carbon-intensive industries</td>
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<td>Developing new options</td>
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We believe that these risk factors are largely covered during the project appraisal cycle and the credit risk assessment.

The Bank will deepen its analysis to:

- better understand how exposed our portfolio is;
- understand the materiality of these risks;
- Understand the implications of any gaps identified in our project cycle and hence, our exposure in terms of reputational risk, financial or credit risk;
- ensure that new and existing investments are managed in way that takes account of significant climate change risks to the extent possible;
- actively engage with the wider investment community and policy makers on reporting and managing climate change risks.